

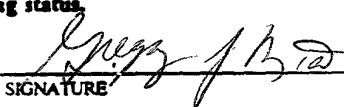
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FORM PTO-1396 (REV. 9-2001)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER Costa 5-3-4-4	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371					
INTERNATIONAL APPLICATION NO. PCT/EP00/05705		INTERNATIONAL FILING DATE 20 June 2000		PRIORITY DATE CLAIMED 22 October 1999	
TITLE OF INVENTION User Registration And Location Management For Mobile Telecommunications Systems					
APPLICANT(S) FOR DO/EO/US Costa, M., Mastromartino, E., Salgarelli, L., Sivagnanasundaram, S.					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.					
2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.					
3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.					
4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).					
5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))					
a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).					
b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.					
c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).					
6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).					
a. <input type="checkbox"/> is attached hereto.					
b. <input checked="" type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).					
7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))					
a. <input checked="" type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).					
b. <input type="checkbox"/> have been communicated by the International Bureau.					
c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.					
d. <input type="checkbox"/> have not been made and will not be made.					
8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).					
9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).					
10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).					
Items 11 to 20 below concern document(s) or information included:					
11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.					
12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included					
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U.S. APPLICATION NO. 10/089765 INTERNATIONAL APPLICATION NO. PCT/EP00/05705		ATTORNEY'S DOCKET NUMBER Costa 5-3-4-4	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. \$1040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =		CALCULATIONS PTO USE ONLY \$ 890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	12 - 20 =		x \$18.00
Independent claims	2 - 3 =		x \$84.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$280.00	\$
TOTAL OF ABOVE CALCULATIONS =			\$ 890.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.		+	\$
SUBTOTAL =			\$ 890.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			\$
TOTAL NATIONAL FEE =			\$ 890.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +			\$ 40.00
TOTAL FEES ENCLOSED =			\$ 930.00
		Amount to be refunded:	\$
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a. <input type="checkbox"/> A check in the amount of \$ _____ to cover the above fees is enclosed. b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>12-2325</u> in the amount of \$ <u>930.00</u> to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>12-2325</u> . A duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038			
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		REGISTRATION NUMBER	

10/089765

IN THE UNITED STATES

JC10 Rec'd PCT/PTO 01 APR 2002

PATENT AND TRADEMARK OFFICE

Patent Application

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 Luca Salgarelli
 Sutha Sivagnanasundaram

Case 5-3-4-4

Serial No.

Examiner

Title User Registration and Location Management for Mobile
 Telecommunications Systems

ASSISTANT COMMISSION OF PATENTS

WASHINGTON, D.C. 20231

SIR:

PRELIMINARY AMENDMENT

IN THE CLAIMS

Delete claim 13.

Amend claims 1, 2, 5, and 7-12.

1. (once amended) A method of use of a mobile telecommunications network, comprising utilizing signaling to indicate changes in an IP sub-network.
2. (once amended) A method for a mobile terminal associated with a mobile telecommunications network to register its position and/or update its location with regard to UMTS and IP registration, comprising integrating UMTS and IP procedures.
3. (no change) A method as claimed in Claim 2, comprising a method for a mobile terminal to register its position with regard to UMTS and IP registration, the method comprising using UMTS 'register request' and/or 'register complete' messages for detecting IP information.
4. (no change) A method as claimed in Claim 3, wherein fields of information relevant to the IP domain are sent with the 'register req' message.
5. (once amended) A method as claimed in Claim 4, wherein the fields are: (1) type of home address, (2) type of care of address (COA), and, optionally, any of the following: (3) home IP address, (4) home agents (HA) address and (5) last used COA.
6. (no change) A method as claimed in Claim 5, wherein additional fields of information are sent with the 'register complete' message.
7. (once amended) A method as claimed in Claim 6, wherein the fields comprise (1) home address, (2) COA type and (3) COA.
8. (once amended) A method as claimed in Claim 2, comprising a method for a mobile terminal to update its location, wherein the method comprises using UMTS 'location update' and/or 'location update complete' messages to detect IP information.
9. (once amended) A method as claimed in Claim 8, wherein additional fields of information relevant to the IP domain are sent with the 'location update' message.

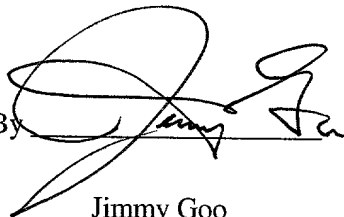
10. (once amended) A method as claimed in Claim 9, wherein the additional fields comprise (1) home address, (2) COA type and (3) COA.
11. (once amended) A method as claimed in Claim 8, wherein additional fields are sent with the 'location update complete' message.
12. (once amended) A method as claimed in Claim 11, wherein the additional fields comprise (1) type and (2) COA.

REMARKS

Claims 1-12 are in this application. Claims 1, 2, 5, and 7-12 were amended.
Claim 13 has been cancelled.

No additional fee is due.

Respectfully,
Mauro Costa
Emiliano Mastromartino
Luca Salgarelli
Sutha Sivagnanasundaram

By 
Jimmy Goo

Reg. No. 36,528

Date: 03/21/02

MARKED-UP VERSION OF THE CLAIMS

1. (once amended) A method of use of a [UMTS] mobile telecommunications network, comprising [utilising UMTS signalling] utilizing signaling to indicate changes in an IP sub-network.
2. (once amended) A method for a mobile terminal associated with a [UMTS] mobile telecommunications network to register its position and/or update its location with regard to UMTS and IP registration, comprising integrating UMTS and IP procedures.
3. (no change) A method as claimed in Claim 2, comprising a method for a mobile terminal to register its position with regard to UMTS and IP registration, the method comprising using UMTS 'register request' and/or 'register complete' messages for detecting IP information.
4. (no change) A method as claimed in Claim 3, wherein fields of information relevant to the IP domain are sent with the 'register req' message.
5. (once amended) A method as claimed in Claim 4, wherein the fields [(in case the mobile terminal is IP capable)] are: (1) type of home address, (2) type of care of address (COA), and, optionally, any of the following: (3) home IP address, (4) home agents (HA) address and (5) last used COA.
6. (no change) A method as claimed in Claim 5, wherein additional fields of information are sent with the 'register complete' message.
7. (once amended) A method as claimed in Claim 6, wherein the fields comprise [(in case the mobile terminal is IP capable)] (1) home address, (2) COA type and (3) COA.
8. (once amended) A method as claimed in [any preceding claim] Claim 2, comprising a method for a mobile terminal to update its location, wherein the method comprises using UMTS 'location update' and/or 'location update complete' messages to detect IP information.
9. (once amended) A method as claimed in Claim 8, wherein additional fields of information relevant to the IP domain are sent with the 'location update' message.[,]

10. (once amended) A method as claimed in Claim 9, wherein the additional fields comprise [(in case the mobile terminal is IP capable)] (1) home address, (2) COA type and (3) COA.

11. (once amended) A method as claimed in [any of Claims] Claim 8 [to 10], wherein additional fields are sent with the 'location update complete' message.

12. (once amended) A method as claimed in Claim 11, wherein the additional fields comprise [(in case the mobile terminal is IP capable)] (1) type and (2) COA.

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USER REGISTRATION AND LOCATION MANAGEMENT
FOR MOBILE TELECOMMUNICATIONS SYSTEMS

Background of the Invention

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This invention relates to user registration and location management for mobile telecommunications systems. In particular, it relates to Universal Mobile Telecommunications Service (UMTS) systems, when used to provide connectivity between an IP (Internet Protocol) capable end-device and an IP-based network.

10

When a UMTS user switches on his mobile terminal (MT), the user needs to be registered with the UMTS network. Similarly, when the user moves around the area covered by the network, location management procedures need to take place in order to allow the user to be provided with services.

15

The initial registration process normally involves requesting for registration on the network, authentication of the user by the network, registration of the user and informing the home location register (HLR) of the users current whereabouts. This takes place at the UMTS level.

20

At the IP (Internet Protocol) level, there are three scenarios to consider when the user switches on an IP capable terminal. These are:

25

- (1) the user has a static home IP address,
- (2) the user requires a dynamic home IP address from the UMTS operator, and
- (3) the user requires a dynamic home IP address from a body outside the UMTS domain.

30

In any case, a mobile IP registration with the home agent (HA) and

- 2 -

perhaps the foreign agent (FA) needs to take place before the user can successfully engage in a data transaction using the Internet Protocol.

The current solution for the registration of data (IP) users in UMTS with mobile IP relies on the use of two, subsequent, registrations, the first at the UMTS level and the second at the IP level. This is shown in Figure 1.

The user of a mobile terminal switches on his mobile terminal MT1 and requires registration with the UMTS network. He sends a message 2 requesting registration which passes through a radio network controller (RNC) 3 (which may also be the foreign agent (FA) for the IP protocol) to a switching centre with a visiting location register (VLR) 4. This in turn requests user information from any previous visiting location register 5 which the user may have last received service from, or from the user's home location register (HLR) 6. This sends back information concerning the user to the new VLR 4 and then an authentication request 7 and reply 8 are sent to and received from the mobile terminal 1. After this authentication, registration of the mobile terminal is complete and a register complete message 9 is sent to the terminal. Also, a message 10 is sent to the HLR informing the HLR of the new location of the terminal.

20

If IP registration is also required, then a further IP registration step also has to take place with conventional systems.

Once UMTS registration is complete, the mobile terminal 1 sets up a UMTS data channel 11. The mobile terminal 1 sends an FA router solicitation message 12 to the new RNC/FA 3 and this in turn sends an FA advertisement 13 back to the mobile terminal over the data channel. The mobile terminal then sends a registration request which passes through the RNC/FA 3 and onwards to the home agent 14. This then sends back a registration reply 15 to the mobile terminal and IP registration is complete. The foreign agent FA in IP is analogous

30

to the VLR (visiting location register) in the UMTS domain.

Accordingly, two independent registration processes are necessary, first the UMTS registration and then the IP registration.

5

When a UMTS user moves around the area covered by the network, location management procedures need to take place in order to allow the user to be provided with services. Location management under a single radio network controller (RNC) does not affect the IP level. However, inter-RNC location
10 updates have to involve IP level mobility as well as UMTS mobility. This is because it is assumed that mobile IP foreign agents (FA's) and RNC's are co-located.

Conventionally, an analogous process to the conventional method of
15 registration has been done. Firstly UMTS location update is done and then, independently, a subsequent IP location update is done. This is shown in Figure 2.

The location update procedures are similar in principle to the registration
20 updates of Figure 1, except that the location update 16 is required for both IP and UMTS, rather than register updates. Apart from this, the procedures involve similar steps, mutatis mutandis.

In both the user registration and location management scenarios, the
25 complete separation of the two procedures for UMTS and IP bring inefficiencies in the usage of the air-interface, and delays to the overall registration or location update procedure.

The present invention arose in an attempt to reduce these inefficiencies
30 and to reduce the time taken for the overall registration procedure or for the

overall location update procedure.

It is known from the paper by Clapton A J et al entitled "UMTS – the mobile part of broadband communications for the next century", BT Technical Journal, GB, BT Laboratories, vol. 16, no. 2, 1 April 1998, pages 120-131, XP000750524 ISSN 5 = 1358 – 3948 to provide a method for a mobile terminal in a UMTS and IP telecommunications network to register and/or update its location.

Brief Summary of the Invention

The present invention is characterised over the disclosure of the Clapton paper by using UMTS messages to transmit IP information for IP registration and/or IP 10 location update.

Mobile-IP specifications allow for link-layer mechanisms to be used to discover a foreign agent (FA) or to detect a change in the sub-network. In a preferred embodiment of the invention, accordingly, the UMTS level mobility-management (link-layer) is used for FA discovery.

15 More specifically, the method may comprise using UMTS 'register request' and 'register complete' messages for detecting FA information.

Preferably, additional fields of information are sent with the 'register request' message and with the 'register complete' message.

The fields which may be sent with the 'register request' message are: (1) 20 type of home address, (2) type of COA (care of address), (3) home IP address, (4) home agents address, and (5) last used COA.

The additional field for the 'register complete' messages may be (1) home address, (2) COA type and (3) COA.

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- 5 -

In further embodiments relating to location management, the UMTS 'location update' and 'location update complete' messages may be used.

Preferably, extra fields of information are provided in one or both of these messages. The fields which may be attached to the 'location update' message are:
5 (1) home address, (2) COA type and (3) COA.

The extra fields which may be attached to the 'location update complete' message may comprise any of (1) type and (2) COA.
10

Description of the Drawings

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

15 Figure 1 shows UMTS and IP registration procedures according to the prior art;

Figure 2 shows UMTS and IP location update procedures according to the prior art;

20 Figure 3 shows an integrated registration procedure according to the present invention; and

Figure 4 shows an integrated location update procedure according to the present invention.

Detailed Description of Preferred Embodiments of the Invention

25

Referring to Figure 3, in embodiments of the invention, the UMTS level mobility-management (link-layer) may be used for FA discovery. Accordingly, the UMTS 'register req' and 'register complete' messages are used for discovering the FA care-of-address (COA) or obtaining a co-located COA for a
30 mobile terminal. Thus, in the Figure, when a mobile terminal 1 requires to

- 6 -

register with a network, it sends out a modified register request message 30 with the addition of various IP related fields.

These fields are:

- 5
- (1) type of home address
 - (2) type of COA
 - (3) home IP address (optional)
 - (4) home agents address (optional)
 - (5) last used COA (optional)
- 10

Note that if the mobile terminal 1 is not IP capable, then the additional fields are not used.

More particularly, the fields are the following:

- 15
- (1) Type: this field identifies to the network if the mobile terminal 1 has a static address or requires a dynamic address from the UMTS operator, or requires a dynamic address from an entity outside the UMTS domain.
 - (2) Type of COA: this identifies if the mobile terminal is to use a co-located COA or a FA, the address in the COA field depends upon this setting.
 - (3) Home address: if the mobile is configured with a static home address, this field identifies that address. If the mobile does not have a statically configured home address, this field is omitted.
 - (4) Home agent: if the mobile has been configured statically with its home agent address, this field identifies it. Otherwise, this field is omitted.
 - (5) Last used COA: this field contains the mobile's last used COA, if any. Otherwise this field is omitted.
- 20
- 25
- 30

- 7 -

The 'register req', with attached IP fields is functionally similar to the FA router solicitation 12 of Figure 1.

The 'register complete' message is, from the IP perspective, the FA advertisement. The additional IP fields in the 'register complete' message are:

- (1) home address: home address of the user
- (2) type: the type of COA used at present, co-located or foreign agent (FA)
- (3) COA: the COA.

10

If the user does not have a static address and the UMTS network could not obtain a home address for the user, then the user will be required to use IP level mechanisms to obtain one. The UMTS network will, however, issue the user with the address of the FA or the co-located COA.

15

Subsequent to the register complete message 32, the mobile then uses a UMTS data channel to send a mobile-IP registration message 33 to the FA (or direct to the HA in case of a co-located COA). This procedure takes place at the IP level, where a data channel 34 is set up over the UMTS radio interface for carrying IP control messages. The HA (or FA) then transmits a registration reply message 35.

20

Figure 4 shows an embodiment of the invention representing an integrated procedure for location management with mobile IP and UMTS. The procedure differs from that of the prior art in that the mobile terminal 40, in its 'location update request' transmission 41 also includes one or more extra fields. The fields are:

25

- (1) home address: home address of the user
- (2) type: the type of COA used at present, co-located or foreign agent (FA)

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(3) COA: the COA.

An authentication routine then follows and, once the UMTS level location update is successfully completed, the RNC/FA checks whether a new COA needs to be issued. They can do this because of the information that was presented by the mobile terminal 40 in the 'location update request' message 41. If a new COA needs to be issued, it is attached to a "location update complete" message 42. The extra fields of information required within this message are (1) type and (2) COA. This message is used by the mobile terminal 40 at the IP level, as detection for mobile IP. A data channel is set up and the mobile terminal decides what it needs and whether it needs to do anything in relation to registering with a new FA and HA and this takes place at a registration request step 44. The mobile terminal registers either with a new RNC/FA 46 and with the home agent (HA) 47. If route optimisation is enabled, then the new FA will re-register the user at the old FA.

Embodiments of the invention accordingly allow a reduction in signalling messages that have to be transmitted across the air interface, during registration or during an inter-RNC location update, and minimise the delay required to complete such location updates. In effect, therefore, valuable network resources are saved and overhead is reduced.

Embodiments of the invention in general utilise UMTS signalling for detecting changes in the IP sub-network and integration of IP level signalling and UMTS level signalling. The invention may have wider use than the two specific scenarios described (user registration and location management) and may be applied to other scenarios where IP signalling is required.

Mobile IP information is sent during UMTS signalling for the reasons described above.

Claims

1. A method for a mobile terminal in a UMTS and IP telecommunications network to register and/or update its location characterised by using UMTS messages to transmit IP information for IP registration and/or IP location update.
- 5 2. A method according to Claim 1, in which the UMTS messages used to transmit IP information for IP registration are UMTS 'register request' and/or 'register complete' messages.
3. A method as claimed in Claim 2, wherein fields of information relevant to the IP domain are sent with the 'register request' message.
- 10 4. A method as claimed in Claim 3, wherein the fields in case the mobile terminal is IP capable are: (1) type of home address, (2) type of care of address COA, and, optionally, any of the following: (3) home IP address, (4) home agents HA address and (5) last used COA.
5. A method as claimed in Claim 4, wherein additional fields of
15 information are sent with the 'register complete' message.
6. A method as claimed in Claim 5, wherein the additional fields comprise in case the mobile terminal is IP capable (1) home address, (2) COA type and (3) COA.
7. A method as claimed in Claim 1, comprising a method for the mobile
20 terminal to update its location, wherein the method comprises using UMTS 'location update' and/or 'location update complete' messages to transmit IP information for IP location update.
8. A method as claimed in Claim 7, wherein fields of information relevant to the IP domain are sent with the 'location update' message.
- 25 9. A method as claimed in Claim 8, wherein the fields comprise in case the mobile terminal is IP capable (1) home address, (2) COA type and (3) COA.
10. A method as claimed in any of Claims 7 to 9, wherein additional fields are sent with the 'location update complete' message.

- 10 -

11. A method as claimed in Claim 10, wherein the additional fields comprise in case the mobile terminal is IP capable (1) type and (2) COA.

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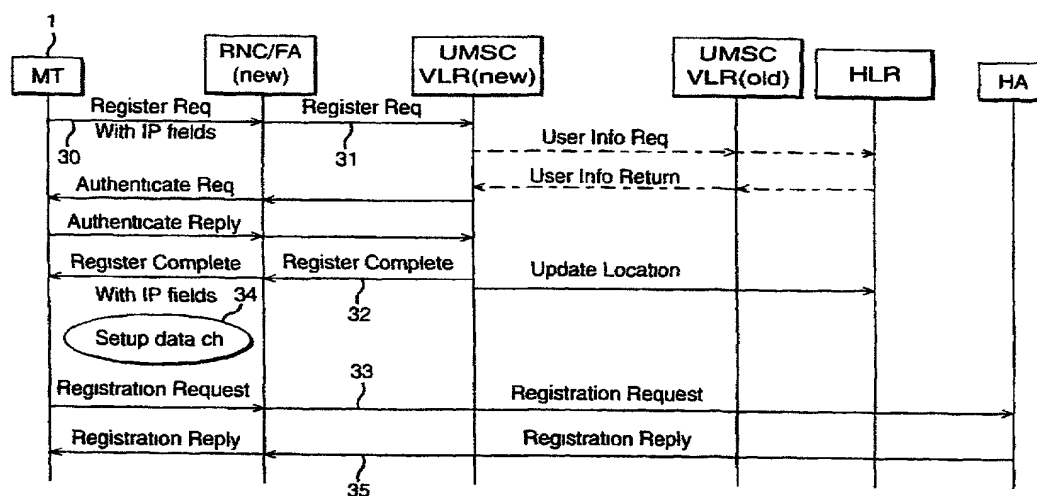
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(57) Abstract: A method of use of a UMTS telecommunications network, comprising utilising UMTS signalling to indicate changes in an IP sub-network. To register a Mobile Terminal (MT) or to update its location within the network, signalling relevant to the IP domain is transmitted with UMTS signalling in an integrated approach. This reduces the number of signalling messages that are required and minimises delays.

WO 01/31859 A1

FIG. 1(PRIOR ART)

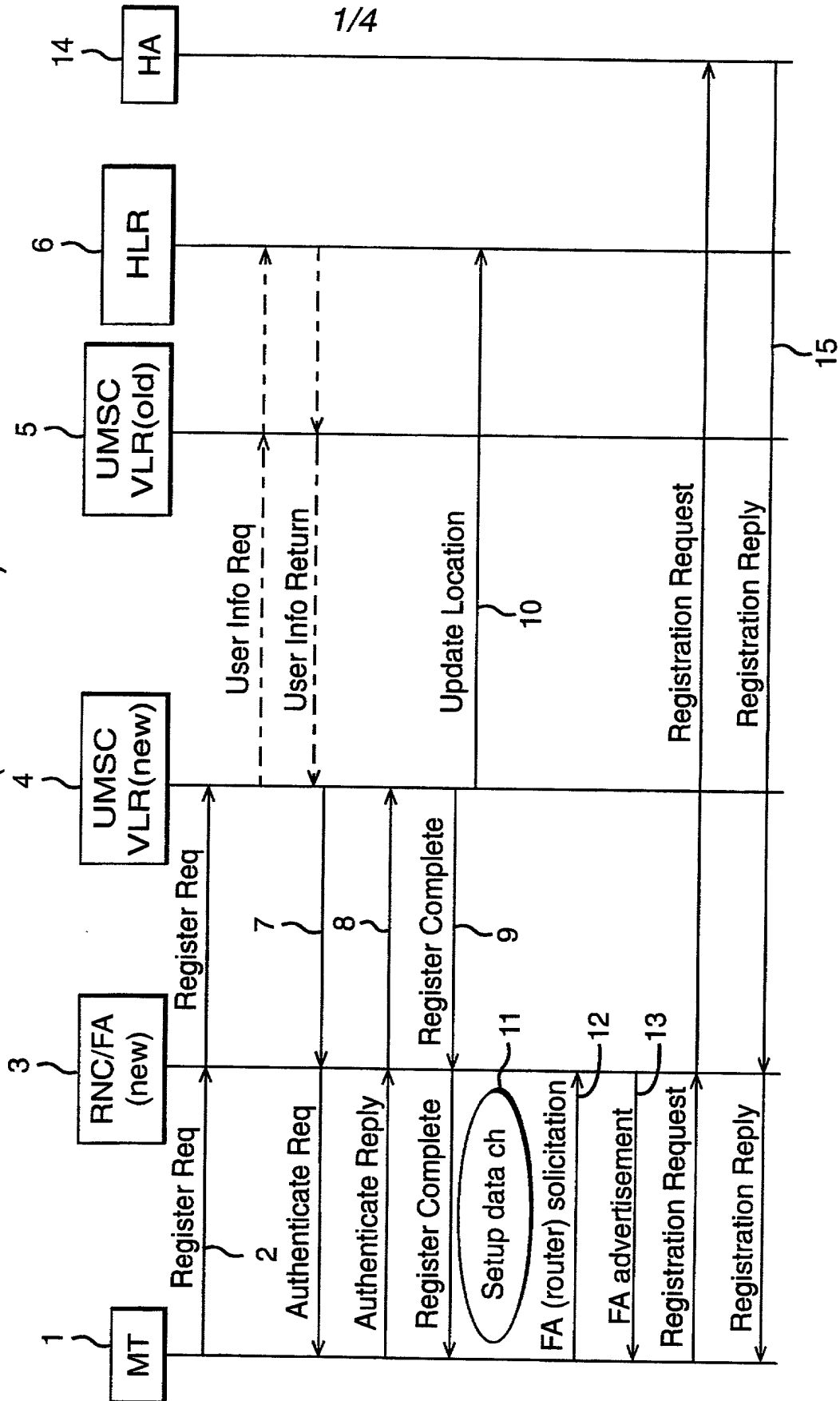


FIG. 2(PRIOR ART)

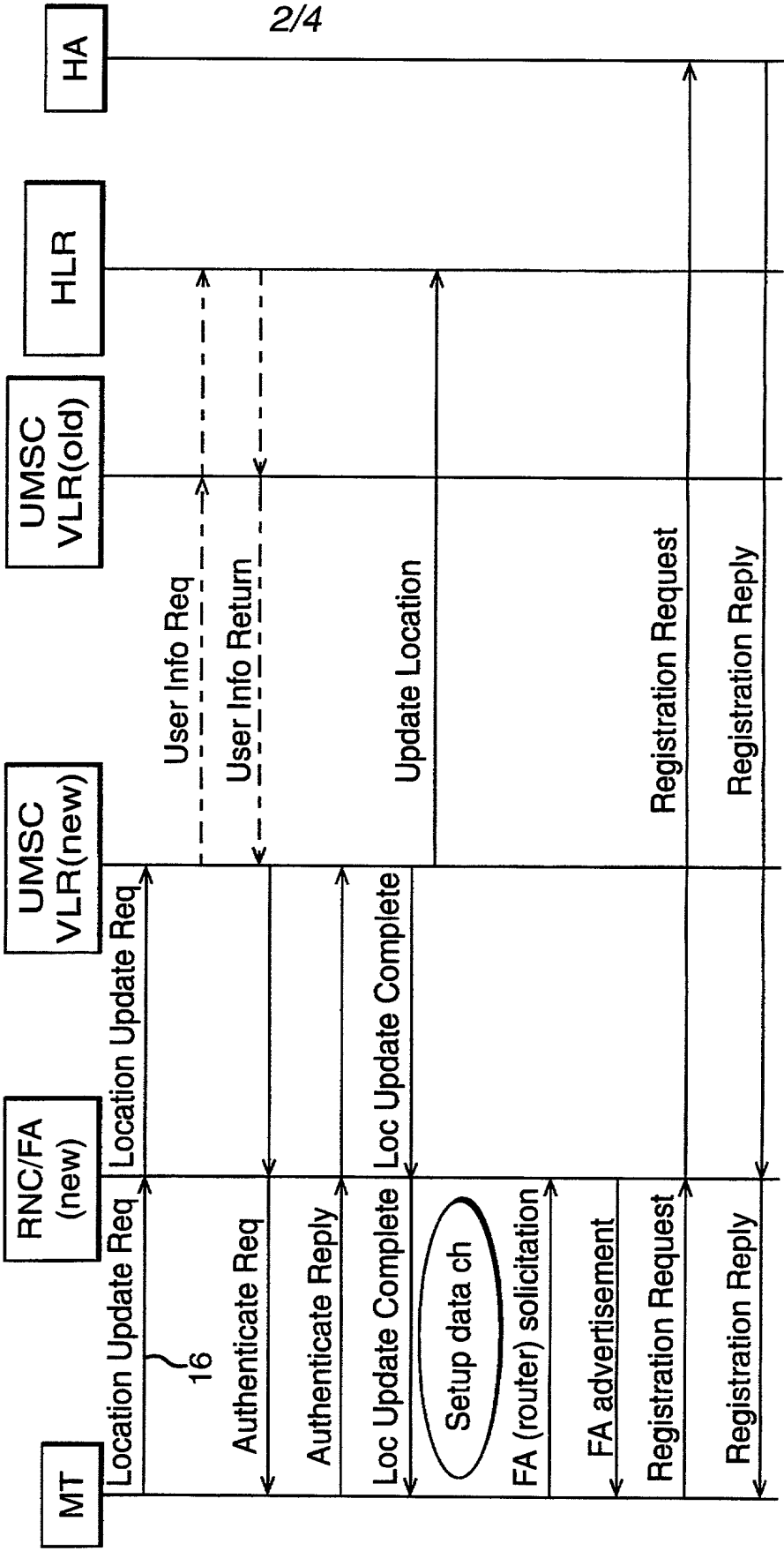


FIG. 3

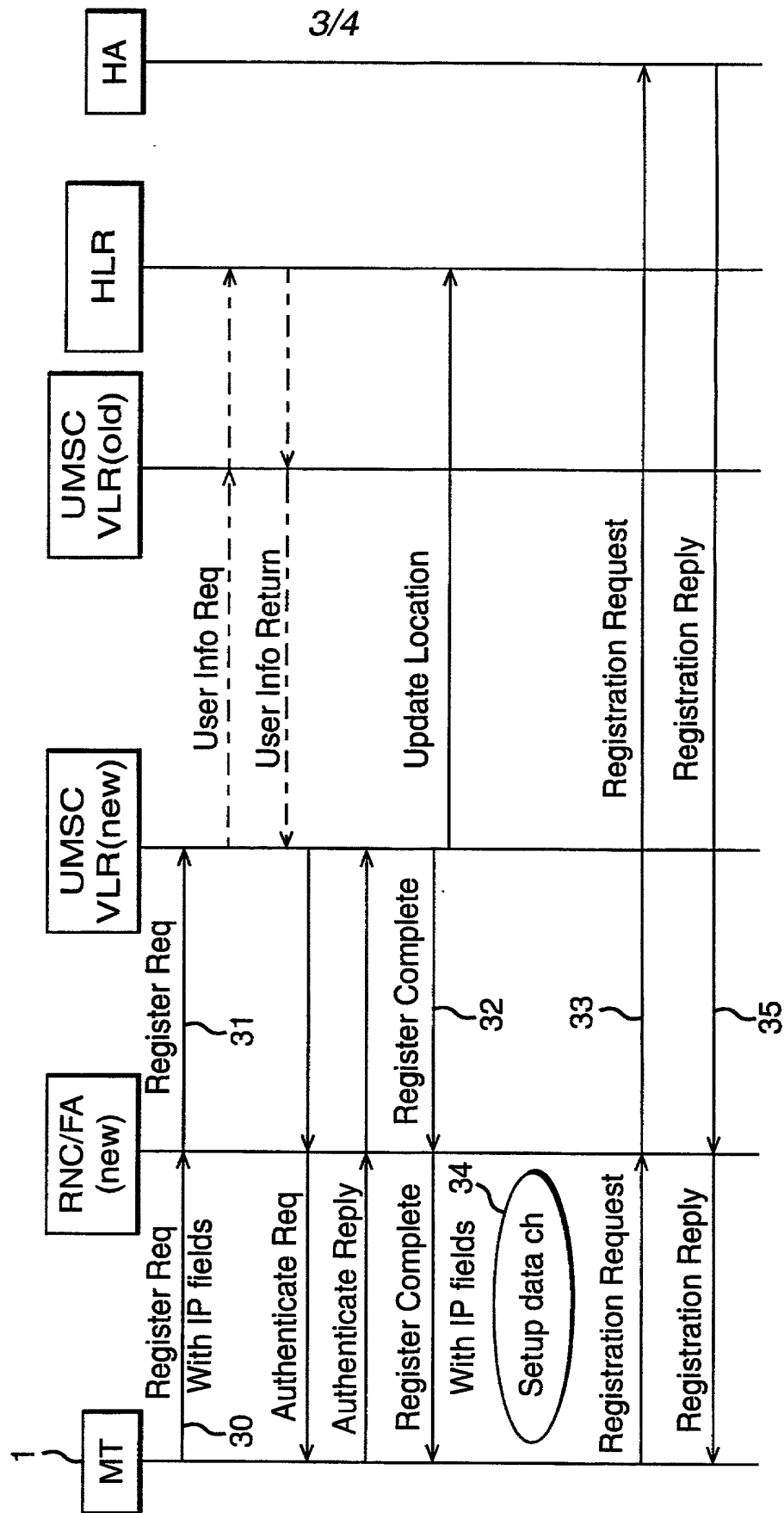
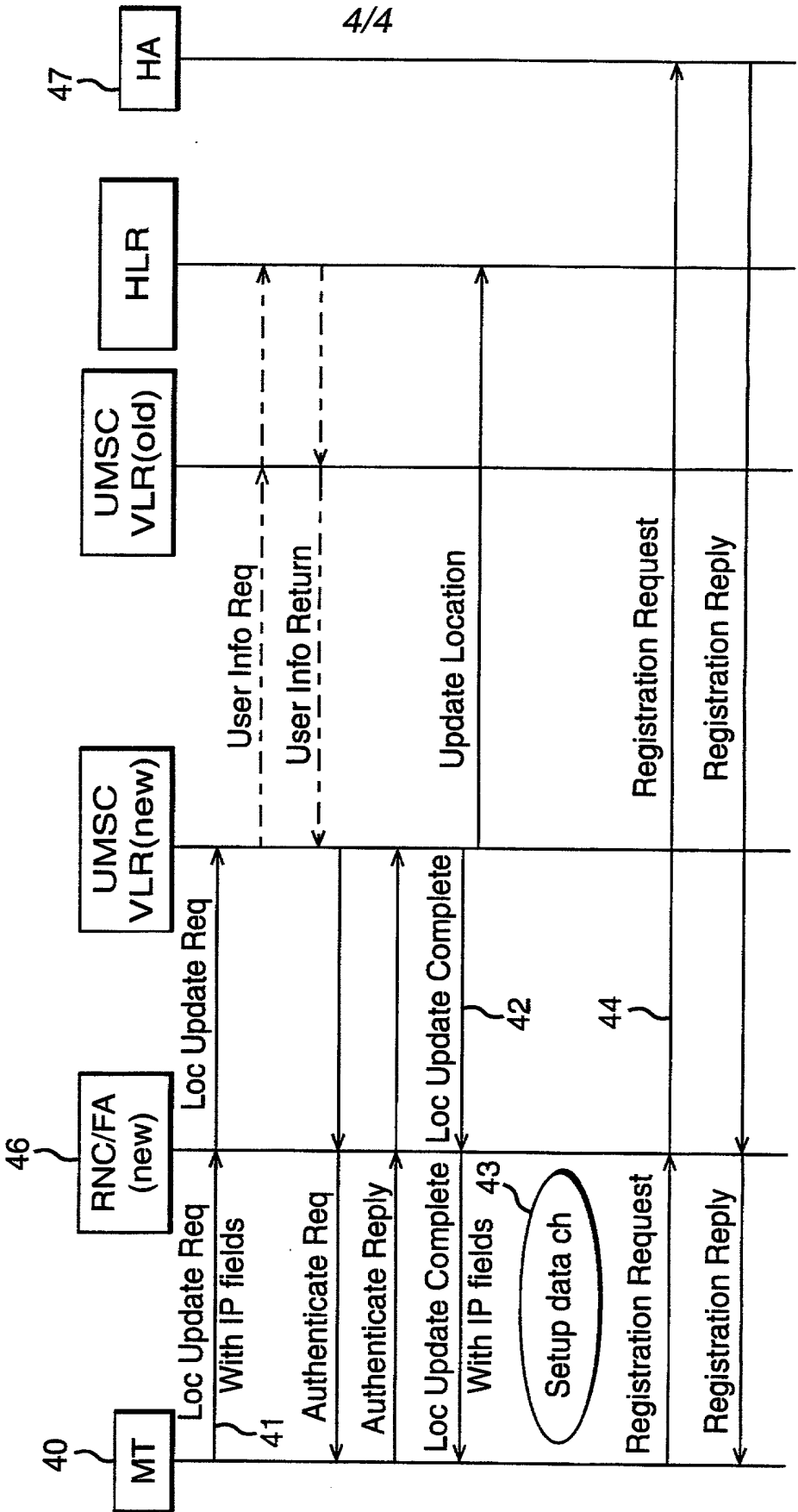


FIG. 4



IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Declaration and Power of Attorney

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **User Registration And Location Management For Mobile Telecommunications Systems** the specification of which

☒ is attached hereto

OR

☐ was filed on _____ and granted Application Serial Number _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment, if any, specifically referred to in this oath or declaration.

I acknowledge the duty to disclose all information known to me which is material to patentability as defined in Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

European Application No. 99308340.1 Filed: October 22, 1999

I hereby claim the benefit under Title 35, United States Code, 120 of any foreign application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

**International
Application No.
PCT/EP00/05705**

**Filing Date
20TH June 2000**

**Status
Pending**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

I hereby appoint the following attorney(s) with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith:

Thomas J. Bean	(Reg. No. <u>44528</u>)
Lester H. Birnbaum	(Reg. No. <u>25830</u>)
Richard J. Botos	(Reg. No. <u>32016</u>)
Jeffery J. Brosemer	(Reg. No. <u>36096</u>)
Kenneth M. Brown	(Reg. No. <u>37590</u>)
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John C. Moran	(Reg. No. <u>30782</u>)
Michael A. Morra	(Reg. No. <u>28975</u>)
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Joseph J. Opalach	(Reg. No. <u>36229</u>)
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Eugen E. Pacher	(Reg. No. <u>29964</u>)
Jack R. Penrod	(Reg. No. <u>31864</u>)
Gregory C. Ranieri	(Reg. No. <u>29695</u>)
Scott J. Rittman	(Reg. No. <u>39010</u>)
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Ronald D. Slusky	(Reg. No. <u>26585</u>)
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John P. Veschi	(Reg. No. <u>39058</u>)
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